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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
ELFIDO COSS, JR. *ET AL.*

Serial No.: 09/479,852

Filed: 1/7/2000

For: A METHOD FOR REQUESTING RACE DATA REPORTS FROM FDC SEMICONDUCTOR FABRICATION PROCESSES

Group Art Unit: 2125

Examiner: WALTER R. SWINDELL

Atty. Dkt. No.: 2000.021100/JAP



## APPEAL BRIEF

**Mail Stop Appeal Brief – Patents**
Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

**CERTIFICATE OF MAILING 37 CFR 1.8**

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on June 27, 2003.

Yolanda Murillo
Yolanda Murillo

Sir:

Applicants hereby submit an original and two copies of this Appeal Brief to the Board of Patent Appeals and Interferences in response to the final Office Action dated January 30, 2003. The fee for filing this Appeal Brief is $320, and is attached hereto.

If the check is inadvertently omitted, or should any additional fees under 37 C.F.R. §§ 1.16 to 1.21 be required for any reason relating to the enclosed material, or should an overpayment be included herein, the Assistant Commissioner is authorized to deduct or credit said fees from or to Advanced Micro Devices, Inc. Deposit Account No. 01-0365/TT3263.

## I. REAL PARTY IN INTEREST

Advanced Micro Devices, Inc., the assignee hereof, is the real party in interest.

## II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences of which Applicants, Applicants' legal representative, or the Assignee is aware that will directly affect or be directly affected by or have a bearing on the decision in this appeal.

## III. STATUS OF THE CLAIMS

Claims 1-36 are pending in the application. The Office Action rejected each of the claims 1-36. More particularly, the Office Action rejected claims 1-36 as anticipated under 35 U.S.C. § 102 (b) by U.S. Letters Patent 6,002,989 ("Shiba, *et al.*").

## IV. STATUS OF AMENDMENTS

There were no amendments submitted after the "final" Office Action.

## V. SUMMARY OF THE INVENTION

The invention, in its various aspects, is an apparatus and a method, best shown in **FIG. 2** and **FIG. 3**, respectively, for dynamically generating trace data reports in a semiconductor fabrication process employing fault detection control. **FIG. 2** and **FIG. 3** are reproduced below for the convenience of the Office.

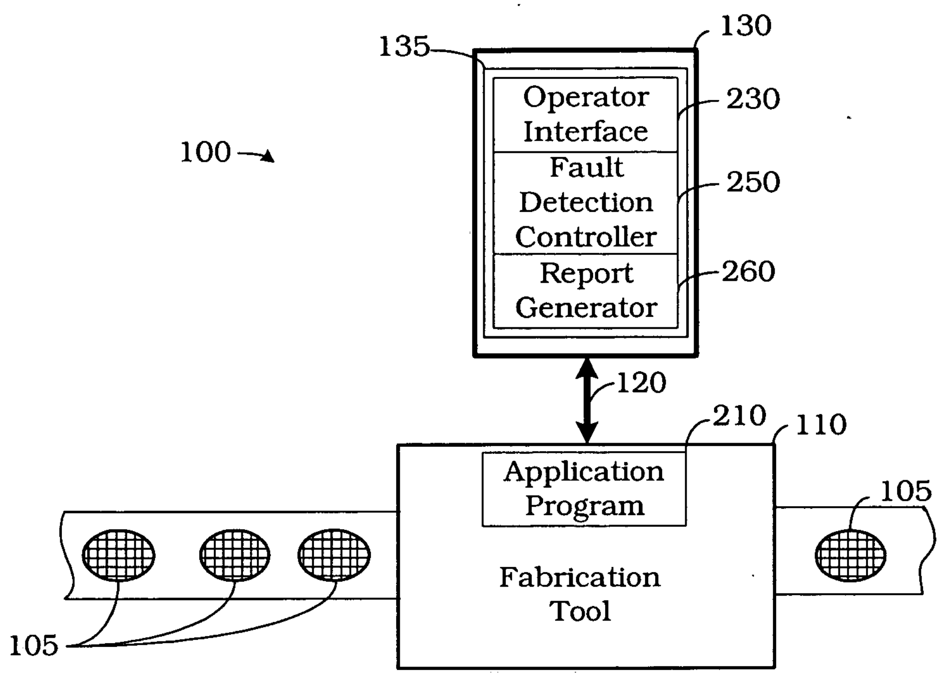
100
135
130
Operator Interface
230
Fault Detection Controller
250
Report Generator
260
120
210
110
Application Program
Fabrication Tool
105
105

Fig. 2

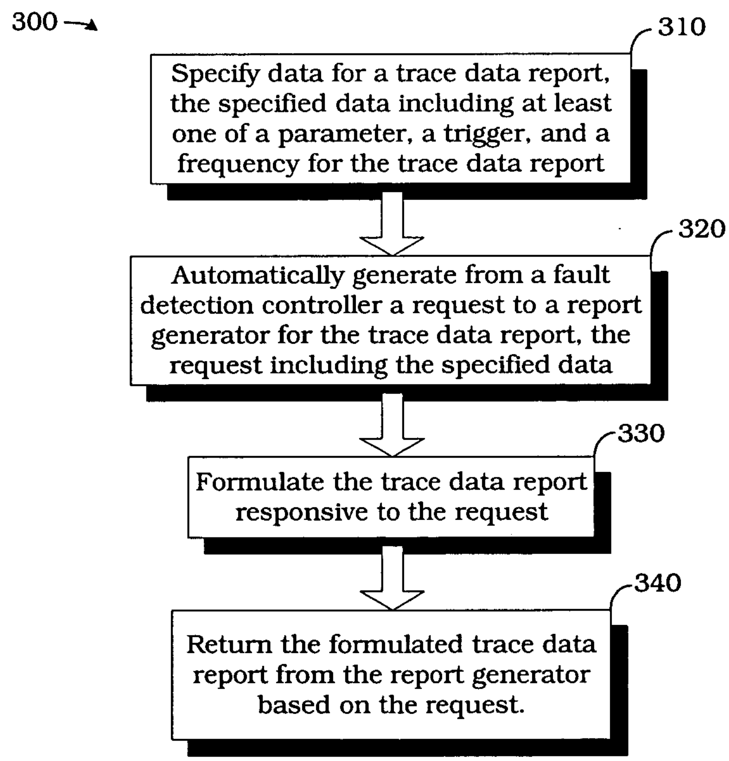
300
310
Specify data for a trace data report, the specified data including at least one of a parameter, a trigger, and a frequency for the trace data report
320
Automatically generate from a fault detection controller a request to a report generator for the trace data report, the request including the specified data
330
Formulate the trace data report responsive to the request
340
Return the formulated trace data report from the report generator based on the request.

Fig. 3

Referring now to both **FIG. 2** and **FIG. 3**, the method comprises:

- specifying (at 310) data for a trace data report, the specified data including at least one of a parameter, a trigger, and a frequency for the trace data report;
- automatically generating (at 320) from a fault detection controller 250 a request to a report generator 260 for the trace data report, the request including the specified data;
- formulating (at 330) the trace data report responsive to the request; and
- returning (at 340) the formulated trace data report from the report generator 260 based on the request.

In other aspects, the invention comprises a computer (130) programmed to perform this method and a computer-readable, program storage medium (135) encoded with instructions that perform this method when executed by a computer.

The apparatus is a semiconductor fabrication processing system 100, comprising: a fabrication tool 110 capable of providing at least one of specified data and a trace data report; a fault detection controller 250 implementing a fault detection control, the fault detection controller 250 being capable of automatically generating (at 320) a request for the trace data report, the request including the specified data; a report generator 260 capable of requesting at least one of the specified data and the trace data report from the fabrication tool 110 and capable of, if the specified data is requested from the fabrication tool 110, providing the trace data report; and an operator interface 230 for receiving data specified for the trace data report, the specified data including at least one of a parameter, a trigger, and a frequency for the trace data report, and to which the trace data report may be returned from at least one of the report generator 260 and the fabrication tool 110.

## VI. ISSUES ON APPEAL

A. Whether U.S. Letters Patent 6,002,989 ("Shiba, *et al.*") anticipates claims 1-36.

## VII. GROUPING OF THE CLAIMS

The claims rise and fall together.

## VIII. ARGUMENT

The "final" Office Action rejected each of the claims 1-36 as anticipated under 35 U.S.C. § 102 (b) by U.S. Letters Patent 6,002,989 ("Shiba, *et al.*"). An anticipating reference, by definition, must disclose every limitation of the rejected claim in the same relationship to one another as set forth in the claim. *In re Bond*, 15 U.S.P.Q.2d (BNA) 1566, 1567 (Fed. Cir. 1990). Applicants respectfully submit that Shiba, *et al.* fails to meet this stringent standard.

### A. Summary of the Argument

Applicant respectfully submits that the Office has identified certain teachings of Shiba, *et al.*, divorced them from their context, and then selectively construed them to read on Applicants' invention. Shiba, *et al.* discloses a method for evaluating and setting thresholds used in the inspection of product to find defects, as opposed to generating trace reports. More particularly, as will be discussed more thoroughly below, Shiba, *et al.* analyzes data about product collected by several different machines. The data collected pertains to the product—not to the machines, as would be the case for trace data—and is analyzed for machine performance, rather than machine operation. Furthermore, one of the objectives is to automate the process and eliminate human interaction, which would eliminate any need for generating a report for a process engineer to review. Consequently, many of the limitations recited by Applicants' claims are not taught by Shiba, *et al.*

### B. Statement of Applicants' Position—Shiba, *et al.* Fails to Teach All the Limitations of the Claims

Shiba, *et al.* is directed to evaluating the performance of inspection machines based on the data those machines collect from product, as opposed from the machines themselves. Thus, by definition, the data collected by Shiba, *et al.* is not "trace data," and cannot appear in a "trace data report," such that Shiba, *et al.* cannot be construed to teach anything about generating trace

data reports. Note also the distinction between evaluating the *performance* of the machines, as in Shiba, *et al.*, and the *operation* of the machine, as in the present invention.

For instance, the Office Action cites col. 3, line 62 to col. 4, line 16 as teaching "receiving specified data for a trace data report". This part of Shiba, *et al.* reads as follows:

> More particularly, in FIG. 4, a plurality of inspection apparatuses A to D having different performances and for inspecting, for example, semiconductor wafers are connected through a network 8 and ***failure mode data obtained by the inspection apparatuses such as, for example, sizes, features, positional coordinates and the total number of extraneous substances on the wafers*** are collected into a data collection system 2. The failure mode data are supplied to a data base 2 and when a predetermined term elapses, contents of the data base 3 are updated. The failure mode data are supplied from the data collection system 2 to inter-apparatus correlation degree calculation means 4 and failure occurrence frequency calculation means 5, which calculate a correlation degree among the inspection apparatuses and a failure occurrence frequency. ***There is provided means 6 for selecting an optimum inspection apparatus and calculating an optimum inspection frequency on the basis of the calculated result data of the calculation means 4 and 5***. An inspection apparatus group management system 7 manages and controls the inspection apparatuses A to D on the basis of the calculated result of the optimum inspection apparatus/optimum inspection frequency calculation means 6.

(emphasis added) The passage contains no mention of a trace data report or trace data, both of which the Office Action cites it. Instead, this passage discloses the collection of "failure mode data" for product that is subsequently analyzed to determine the performance (col. 3, line 62 to col. 4, line 16), rather than the operation, of the inspection machines.

Furthermore, the data is never generated into any kind of a report and Shiba, *et al.* therefore does not disclose a report generator. The Office Action specifically cites col. 6, lines 30-64 for teaching the limitation of "formulating the trace data report responsive to the request". This passage reads:

> When the collated (overlapped) result of failures is displayed by the Ben's diagram, the Ben's diagram can be broadly

classified into four cases as shown in FIGS. 5 to 8. The sizes of circles 10a to 10d and 11a to 11d represent the number of failures detected by the inspection apparatuses A and B, respectively. The areas of overlapped portions (hatched portions) 14a to 14d of two circles represent the number of failures detected in common by the inspection apparatuses A and B.

It is now defined that the numbers of failures detected by the inspection apparatuses A and B are Na and Nb, respectively, and the number of failures detected in common by both of them is Nab. The number Nall of failures detected by at least any one of the inspection apparatuses A and B is defined by the following equation (1):

Nall=Na+Nb-Nab (1)

The presence of the correlation degree between the two apparatuses is calculated by the equations (2), (3) and (4). R1 represents a detection ratio of the inspection apparatus B to the number of failures detected by the inspection apparatus A (equation (2)). R2 represents a capture ratio of the inspection apparatus A to the total number of failures (equation (3)). R3 represents a detection ratio of common failures to the number of failures detected by the inspection apparatus A (equation (4)). Thresholds T1 to T3 (for example, 0.9 for each threshold) are set for the ratios R1 to R3, respectively.

R1=Nb/Na (2)

R2=Na/Nall (3)

R3=Nab/Na (4)

Applicants note that there is no mention of a trace report, nor formulating any kind of report in this passage. Hence, the passage fails to disclose "formulating the trace data report responsive to the request" as is recited in all of the independent claims in at least some variation. (claim 1, line 7; claim 7, line 7; claim 15, line 8; claim 23, lines 7-9; claim 30, lines 8-11)

Thus, Shiba, *et al.* fails to disclose generating a trace data report or even mention a trace data report, as is recited in all the independent claims. Applicants respectfully submit that the construction of Shiba, *et al.* in the Office Action to the contrary is mistaken. Since an

anticipating reference must disclose every limitation of the claims, Shiba, *et al.* fails to anticipate claims 1-36.

### C. <u>The Office's Response</u>

Applicants presented this position to the Office in their response to the Office Action dated October 23, 2002. In the "final" Office Action, the Office characterized these arguments as "not persuasive." The Office proffered two grounds: first, that the arguments put forth are "more specific than the claim language" and, second, that reporting is inherent in Shiba, *et al.* Applicants respectfully submit that the Office errs in both statements.

Applicants note that the limitation "trace data report" appears expressly 39 times in 13 different claims. The limitation also appears multiple times in each of the independent claims and, hence is a limitation on each of the dependent claims, as well. Thus, the Office's argument that Applicants' arguments are "more specific than the claims language" are incorrect. The Office attempts to justify its argument by correlating the data collected in Shiba, *et al.* with the data collected in Applicants' invention. Not only is this a non-sequitur, but the rejection is for anticipation, and Shiba, *et al.* must therefore disclose the limitations of the claim—not something that is allegedly similar. Perhaps most importantly, the data collected by Shiba, *et al.* is not "trace data", since the data pertains to product and is used to evaluate performance rather than pertaining to the machine and being used to evaluate operation.

Shiba, *et al.* also nowhere teaches or suggests that the data it collects is reported. The Office points to the diagrams in diagrams of Figures 5-8. However, these diagrams illustrate the analysis of the data in Shiba, *et al.*, and describes them as "Ben's diagram[s] for calculating a correlation degree between inspection apparatuses on the basis of the number of detected failure in the embodiment…." (col. 5, lines 4-16; *see also* col. 7, lines 38-43 and, for more detail, col. 6, line 66 to col. 7, line 37) Furthermore, there is no indication that Ben's diagrams or the results of this analysis is ever reduced to any tangible expression in which it can be communicated, which, after all, is the point of a report. Still further, one of the objectives of Shiba, *et al.* is to automate the process and eliminate human interaction (*see* col. 2, lines 19-24), which would eliminate any need for generating a report for a process engineer to review.

The Office attempts to bolster this position by declaring that "[t]he diagrams of Shiba constitute a teaching of reporting, that is, providing information, is inherent in Shiba." Detailed Action, p. 5. Inherency in anticipation requires that the asserted proposition *necessarily* flow from the disclosure. *In re Oelrich*, 212 U.S.P.Q. (BNA) 323, 326 (C.C.P.A. 1981); *Levy*, 17 U.S.P.Q.2d (BNA) at 1463-64; *Ex parte Skinner*, 2 U.S.P.Q.2d (BNA) 1788, 1789 (Bd. Pat. App. & Int. 1987). It is not enough that a reference could have, should have, or would have been used as the claimed invention. "The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient." *Oelrich*, at 326, quoting *Hansgirg v. Kemmer*, 40 U.S.P.Q. (BNA) 665, 667 (C.C.P.A. 1939); *see also Skinner*, at 1789. At a minimum, it does not necessarily follow from the disclosure of Shiba, *et al.* that the Ben's diagrams of Figures 5-8 are reduced to a tangible expression that is communicated, *i.e.*, generated into a report. Indeed, Shiba, *et al.* actually teaches away from such a result, as established above.

### D. <u>Conclusion of the Argument</u>

Thus, when considered in context and as a whole, and when properly construed, Shiba, *et al.* does not anticipate any of claims 1-36. Each of the claims recites a "trace data report", *i.e.*, a collection of trace data about a machine for use in evaluating the operation of a machine. The data collected in Shiba, *et al.* and cited by the Office is data pertaining to product—rather than a machine—and is used to evaluate machine performance—rather than operation. Therefore, the data is not "trace data." Regardless of whether such data is "trace data," it is never generated into "trace data reports". The Ben's diagrams of Figures 5-8 in Shiba, *et al.* relied on by the Office merely illustrate the analysis employed in Shiba, *et al.*, and are not reports of any kind. To anticipate, Shiba, *et al.* must disclose every limitation of the rejected claims in the same relationship to one another as set forth in the claim. *In re Bond*, 15 U.S.P.Q.2d (BNA) 1566, 1567 (Fed. Cir. 1990). Applicants respectfully submit that Shiba, *et al.* fails to meet this stringent standard.

## IX. CLAIMS AT ISSUE

The claims at issue are set forth in the Appendix hereto.

## X. CONCLUSION

Shiba, *et al.* fails to anticipate claims 1-36, and the application is therefore in condition for allowance. Applicant respectfully submits that the Office has identified certain teachings of Shiba, *et al.*, divorced them from their context, and then selectively construed them to read on Applicants' invention. When considered in context and as a whole, and when properly construed, Shiba, *et al.* does not anticipate any of claims 1-36.

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Respectfully submitted,

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## APPENDIX

**(Claims at Issue)**

1. A method for dynamically generating trace data reports in a semiconductor fabrication process employing fault detection control, the method comprising:

receiving specified data for a trace data report, the specified data including at least one of a parameter, a trigger, and a frequency for the trace data report;

automatically generating from a fault detection controller a request to a report generator for the trace data report, the request including the specified data;

formulating the trace data report responsive to the request; and

returning the formulated trace data report from the report generator based on the request.

2. The method of claim 1, wherein receiving the specified data for the trace data report includes receiving the specified data by manual input.

3. The method of claim 1, wherein requesting the trace data report includes consulting a data store of available parameters.

4. The method of claim 3, wherein the data store comprises at least one of a database, a list, and a file.

5. The method of claim 3, wherein the report generator populates the data store with the available parameters.

6. The method of claim 1, wherein formulating the trace data report responsive to the request includes gathering specified data from a fabrication tool.

7. A computer programmed to perform a method for generating data reports in an advanced process control, semiconductor fabrication process, the method comprising:

receiving specified data for a trace data report, the specified data including at least one of a parameter, a trigger, and a frequency for the trace data report;

automatically generating from a fault detection controller a request to a report generator for the trace data report, the request including the specified data;

formulating the trace data report responsive to the request; and

returning the formulated trace data report from the report generator based on the request.

8. The programmed computer of claim 7, wherein receiving the specified data for the trace data report in the programmed method includes receiving the specified data by manual input.

9. The programmed computer of claim 7, wherein requesting the trace data report in the programmed method includes consulting a data store of available parameters.

10. The programmed computer of claim 9, wherein the store comprises at least one of a database, a list, and a file.

11. The programmed computer of claim 9, wherein the report generator populates the data store with the available parameters.

12. The programmed computer of claim 7, wherein the fault detection controller and the report generator reside on a single computer.

13. The programmed computer of claim 7, wherein the fault detection controller and the report generator reside on different computers.

14. The programmed computer of claim 7, wherein formulating the trace data report responsive to the request in the programmed method includes gathering specified data from a fabrication tool.

15. A computer-readable, program storage medium encoded with instructions that, when executed by a computer, perform a method for generating data reports in an advanced process control, semiconductor fabrication process, the programmed method comprising:

receiving specified data for a trace data report, the specified data including at least one of a parameter, a trigger, and a frequency for the trace data report;

automatically generating from a fault detection controller a request to a report generator for the trace data report, the request including the specified data;

formulating the trace data report responsive to the request; and

returning the formulated trace data report from the report generator based on the request.

16. The computer-readable, program storage medium of claim 15, wherein specifying data for a trace data report in the programmed method includes receiving the specified data by manual input.

17. The computer-readable, program storage medium of claim 15, wherein requesting the trace data report in the programmed method includes consulting a data store of available parameters.

18. The computer-readable, program storage medium of claim 17, wherein the data store comprises at least one of a database, a list, and a file.

19. The computer-readable, program storage medium of claim 17, wherein the report generator populates the data store with the available parameters.

20. The computer-readable, program storage medium of claim 15, wherein the fault detection controller and the report generator reside on a single computer.

21. The computer-readable, program storage medium of claim 15, wherein the fault detection controller and the report generator reside on different computers.

22. The computer-readable, program storage medium of claim 15, wherein formulating the trace data report responsive to the request in the programmed method includes gathering specified data from a fabrication tool.

23. (Amended) A semiconductor fabrication processing system, comprising:

a fabrication tool capable of providing at least one of specified data and a trace data report;

a fault detection controller implementing a fault detection control, the fault detection controller being capable of automatically generating a request for the trace data report, the request including the specified data;

a report generator capable of requesting at least one of the specified data and the trace data report from the fabrication tool and capable of, if the specified data is requested from the fabrication tool, providing the trace data report; and

an operator interface for receiving specified data for the trace data report, the specified data including at least one of a parameter, a trigger, and a frequency for the trace data report, and to which the trace data report may be returned from at least one of the report generator and the fabrication tool.

24. The semiconductor fabrication processing system of claim 23, wherein the operator interface includes a graphical user interface.

25. The semiconductor fabrication processing system of claim 23, further comprising a data store of available parameters that may be received as the specified data.

26. The semiconductor fabrication processing system of claim 25, wherein the store comprises at least one of a database, a list, and a file.

27. The semiconductor fabrication processing system of claim 25, wherein the report generator is capable of populating the data store with the available parameters.

28. The semiconductor fabrication processing system of claim 23, wherein at least two of the fault detection controller, the operator interface, and the report generator reside on the same computer.

29. The semiconductor fabrication processing system of claim 23, wherein the fault detection controller and the report generator reside on different computers.

30. (Amended) An advanced process control, semiconductor fabrication processing system, comprising:

means for fabricating a wafer, the fabricating means being capable of providing at least one of specified data and a trace data report;

means for implementing a fault detection control, the fault detection control means being capable of automatically generating a request for the trace data report, the request including the specified data;

means for generating a report, the report generating means being capable of requesting at least one of the specified data and the trace data report from the fabricating means and capable of, if the specified data is requested from the fabricating means, providing the trace data report; and

means for interfacing with an operator, through which an operator may specify the data for the trace data report, the specified data including at least one of a parameter, a trigger, and a frequency for the trace data report, and to which the trace data report may be returned from at least one of the report generating means and the fabricating means.

31. The semiconductor fabrication processing system of claim 30, wherein the interfacing means includes a graphical user interface.

32. The semiconductor fabrication processing system of claim 30, further comprising means for storing the identities of available parameters that may be specified.

33. The semiconductor fabrication processing system of claim 32, wherein the storing means comprises at least one of a database, a list, and a file.

34. The semiconductor fabrication processing system of claim 32, wherein the report generating means is capable of populating the data store with the available parameters.

35. (Amended) The semiconductor fabrication processing system of claim 30, wherein at least two of the fault detection means, the interfacing means, and the report generating means reside on the same computer.

36. The semiconductor fabrication processing system of claim 30, wherein the fault detection controller and the report generator reside on different computers.